MATH 181 **MIDTERM 4** **FALL 1992**

Professor Libgober

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Find the following integrals:

1. For which p, $\sum_{n=2}^{\infty} \dfrac{1}{n(\ln n)^p}$ converges?

2. For which p, $\sum_{n=1}^{\infty} n(1+n^2)^p$ converges?

Decide convergence or divergence of the following series and indicate which test you would use.

3. $\displaystyle\sum_{n=1}^{\infty}\left(\frac{1-3n}{3+4n}\right)^{n}$

4. $\displaystyle\sum_{n=1}^{\infty}\frac{1}{\sqrt{n(n+1)}}\quad .$

5. Decide if the following series converges absolutely, converges conditionally, or diverges.

$$\sum \frac{(-1)^n}{\sqrt[3]{n(n+1)(n+2)}}$$

6. Find the radius of convergence of $\sum_{n=1}^{\infty} \frac{(-1)^n (x-1)^n}{\sqrt{n}}$. What is the region of convergence of this series?

7. Write the first 5 terms of the Taylor series of e^x about point $c = 3$.

8. Find the Maclaurin series of $y = \cos^2 x$.

9. Find the Maclaurin series of $y = \ln(1 + x)$.

10. Find the first three terms of $y = e^x \ln(1+x)$ about $c = 0$ using multiplication of series.